Help! They Still Don't Understand Counting

Faith H. Sadler

A Feature Article Published in

TEACHING Exceptional Children Plus

Volume 6, Issue 1, October 2009

Help! They Still Don't Understand Counting

Faith H. Sadler

Abstract

Recent research has revealed new information about how preschoolers develop an understanding of counting, and offers exciting new strategies for teaching. These new strategies encourage children to problem solve and use reasoning to understand quantities and how counting works rather than simply providing them practice with counting procedures. There has been evidence for several years now that this type of problem-solving approach (or investigative approach) to mathematics instruction is beneficial for young elementary school students with special needs (Baroody, 1996; Baroody, 1999; Clements, 2000; National Research Council, 2001). Thus, it is likely that these new findings about preschoolers apply not just to young typically developing children but also to preschoolers with special needs. This article describes a new developmental framework for counting and weave within it helpful activities derived from recent research as well as a few activities based on long-established best practices. Lastly, this article briefly discusses how difficulty with counting may or may not be indicative of a math disability.

Keywords
Cardinality, counting, math, preschool

SUGGESTED CITATION:
Sadler, Faith H. (2009). Help! They Still Don't Understand Counting. *TEACHING Exceptional Children Plus,* 6(1) Article 3. Retrieved [date] from
http://escholarship.bc.edu.education/tecplus/vol6/iss1/art3

Why is learning to count so important? Counting is an integral part of even very young children's daily experiences. For example, a preschooler might look for her two shoes, hold up three fingers to show how old she is, or count to see if she has gotten as many cookies as her brother or sister. The National Association for the Education of Young Children and the National Council of Teachers of Mathematics have published a joint position statement (NAEYC & NCTM, 2002) on appropriate mathematics instruction for young children. NCTM has also published pre-kindergarten curriculum focal points. These state that pre-K students should "develop an understanding of the meanings of whole numbers and recognize the number of objects in small groups without counting and by counting [to 10 and beyond]—the first and most basic mathematical algorithm" (NCTM, 2006, p. 11).

Being able to count involves both procedural skills and conceptual understandings.

What do we mean when we say that a child is able to count in a meaningful way? Being able to count includes both procedural skills and conceptual understandings. First of all, the child must be able to follow the procedure of saying the number words in the correct order. They must also demonstrate one-to-one correspondence by saying only one of these counting words as they point to each item. (From here on out, this procedure will be referred to as *tagging*.) Finally, children must understand conceptually that when counting is executed correctly, the final number is the answer to *how many* and thus represents the manyness or quantity of the set. This is called *understanding cardinality.*

Why should cardinality be learned through an approach that fosters reasoning and problem solving? Having children perform a narrow set of skills is simply rote learning at the expense of real understanding. This type of teaching provides children with only a shaky foundation for future learning in mathematics. By contrast, fostering children's ability to reason and problem solve is a long-lasting outcome that will benefit students throughout their mathematics education. What do we mean by reasoning? Reasoning is when children reflect on a question or a problem until they arrive at an answer. They make predictions, draw conclusions and justify their thinking. Reasoning and problem solving are two of the five process standards recommended for classroom use in NAEYC's and NCTM's position statement: "While content represents the *what* of early childhood mathematics education, the processes—problem solving, reasoning, communication, connections, and representation—make it possible for children to acquire content knowledge" (NAEYC & NCTM, 2002, p. 7). In other words, teaching our students to reason about quantity gives them not only a real understanding of counting but also access to many related mathematical concepts.

The stages of cardinality

Bermejo (1996) offers evidence for a six-stage model of cardinality understanding and Clements & Sarama (2009) describe a similar learning trajectory. Because the development of children with developmental disabilities often mirrors the sequence of development seen in children without delays (Bennett-Gates & Zigler, 1998), breaking down the development of meaningful counting into stages

Table 1: The stages of cardinality development

Stages of cardinality development	Stage description for answering *how many?* (Adapted from Bermejo, 1996; and Clements & Sarama, 2009)
Stage I: Pre-counters	• Children do not understand the question *how many*, and so they provide random answers. These children are typically 1-2 years of age.
Stage II: Reciters	• Children respond with a number-word sequence, but without tagging each item.
Stage III: Corresponders	• Children respond to the question by completely recounting the set usually demonstrating one to one correspondence. Children are typically at this stage around 3 years of age.
Stage IV: Immature counters	• Children answer with the last number-tag used even if inaccurate. These children are not mature enough yet to monitor their counting to ensure its accuracy.
Stage V: Rigid rule followers	• Children answer with the largest number-tag included in the count but it may not have been the last tag used. These children are beginning to sleuth out the rules and patterns of how counting works but continue to make errors.
Stage VI: Counters	• Children are able to monitor their own or someone else's counting for accuracy and provide the correct response to the *how many* question. Children reach this stage for the smaller quantities (1-5) around the age of four and for the larger quantities (6-10) around the age of five.

or a trajectory can help special education teachers design activities that are appropriate for individual students. Following is a description of Bermejo's six stages as well as information on how these stages correlate with the trajectory described by Clements and Sarama (2009). In both models, young children move through the stages with the smaller quantities first (1-5) and then repeat the stages with larger quantities (6-10).

- At stage I in Bermejo's model, children do not understand the question *how many*, and so they provide random answers. In Clements & Sarama's learning trajectory model, these children are typically 1-2 years of age and are described as "pre-counters."
- At stage II, children respond with a number-word sequence, but without tagging each item. Clements & Sarama call children at this stage "reciters" and this is seen at around 2 to 3 years of age.
- At stage III in Bermejo's model, children respond to the question by completely recounting the set. Clements & Sarama describe these children as "corresponders" because, although not always accurate, they attempt to tag each item only once as they count. Children are typically at this stage around 3 years of age.

- At stage IV, children answer with the last number-tag used even if it does not correctly describe the set. These children are beginning to sense the importance of the final number but are not mature enough yet to monitor their counting for accuracy. Clements & Sarama do not have equivalent levels for Bermejo's fourth and fifth stages. For the purposes of this article, these children will be referred to as "immature counters." Typically their errors involve counting objects more than once or skipping items.
- At stage V, children answer with the largest number-tag included in the count, but it may not have been the last tag used. These children are beginning to sleuth out the rules and patterns of how counting works and are trying to always apply them. For the purpose of this article, these children will be referred to as "rigid rule followers."
- At stage VI in Bermejo's model, children monitor the counting process for accuracy and provide the correct response to the *how many* question. These children are referred to as "counters (5)" and later as "counters (10)" in the Clements & Sarama model. Most children are counters to 5 around four years of age, and counters to 10 around five years of age.

How can teachers help children progress toward an understanding of cardinality? Following is a discussion of each stage as well as a few activities that would be appropriate for students at that stage. Note that for stages I and II, instruction is mostly procedural but then moves on to a problem-solving and reasoning approach for stages III and beyond.

Stage I: The pre-counters

At stage I, children do not understand the question *how many*, and so they provide random answers. It's likely, however, that children even as young as two years of age can answer correctly when shown very small quantities (1-3). They are recognizing them simply on sight and are using the terms "one," "two," and "three" as simply descriptive labels similar to color words (Benson & Baroody, 2002). This ability is called *perceptual subitizing*. Perceptual subitizing is "recognizing a number without using other mathematical processes [like counting]. For example, children might '*see 3'* " (Clements, 1999, p. 401). Although previously overlooked and undervalued, this early understanding of small quantities is now recognized as being important for teachers to build upon. Baroody (2004) proposes that the ability to perceptually subitize helps children to understand how counting works. Baroody writes, "By comparing the outcome of enumerating [counting] a small collection with the number label generated by subitizing [just looking], preschoolers discover the cardinality principle" (p. 185).

Teachers can help children at this stage by strengthening this informal understanding of small quantities. One way that this can be done is by playing matching and sorting games using index cards with 1-3 stickers on them (Baroody & Benson, 2001). Rather than counting the stickers, children simply find all the cards with two stickers or all the cards with one sticker and so on without counting. In the author's experience, children also benefit from creating matching sets with their fingers. When asked *how many*, children say the answer and hold up that many fingers. To check their answers, the index cards (with 1-3 stickers) are flipped around to reveal a hand drawn or pasted on the backside showing the corresponding finger pattern. See figure 1 below.

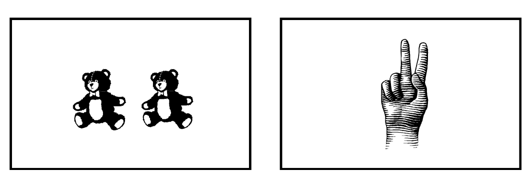

Figure 1.

Young children at this stage can also be working on learning to recite the number words in the correct order (called *rote counting*). If the traditional counting songs and rhymes aren't working, teachers can use a strategy that is most likely familiar: *response shaping* (Sandall et al., 2005). Teachers can begin with a simple rhyme or routine for saying 1, 2, 3. Once this is mastered, teachers can move onto a rhyme or routine for 1, 2, 3, 4, and so on. Easy routines to use might be "1, 2, 3, go!" for racing; "1, 2, 3, 4, out the door!" for whenever students are taken out of the classroom, and "1, 2, 3, 4, 5, down the slide" for time on the playground.

At this stage, teachers can also help by modeling for children what the term *each* means. Teachers might do this by having children assist with passing out materials or with preparing snacks. For example, they might be asked to give each baby a bottle in the dramatic play area, give one bell to each child at music time, or put one napkin beside each chair in preparation for snack.

Stage II: The reciters

At stage two, children respond with a number-word sequence, but without tagging each item. Teachers can help children at this stage by having them pair each number word with an action or object. Pairing number words with large motions is a good place to begin, such as counting while clapping hands, patting legs, or jumping. This helps children feel the one-to-one correspondence within their bodies. In this case, the technique of *embedding* instruction in typical classroom routines and activities is a useful strategy (Sandall et al., 2005). For example, when reading *Goldilocks and the Three Bears* during story time, have children pretend to take three bites of porridge or pound their fists three times like an angry papa bear.

Once children are good at counting while doing large motions, *response shaping* can be used again as teachers advance students to the smaller motions of sliding or pushing objects as they count: for example, sliding crackers from one side of a place mat (with a line down the middle) to the other, or pushing beanbags out of a circle taped to the floor. The teacher can *model* (Sandall et al., 2005) first: "Watch how I push and count my crackers. I'm going to say one number word for each cracker. Now you try it." The teacher might avoid asking *how many* since the student will likely answer incorrectly and thus distract from the point of the lesson (the tagging). Once children are good at counting while pushing or sliding objects, teachers can provide practice with counting by simply pointing to objects that are evenly spaced in a row (e.g., in an ice cube tray).

Teachers should join their students in the wonder and exploration of how counting works.

Children at this stage continue to benefit from many opportunities to work with the smaller quantities of 1-3 or 4 (using perceptual subitizing or counting with assistance). Math curricula for preschoolers typically provide only a few activities for working with these small quantities, thus not providing the *distributed practice* and *generalization* experiences that many children with special needs require (Cepeda et al., 2006; Sandall et al., 2005). The book *Much More Than Counting* (Moomaw & Hieronymus, 1999) and the following web site are good resources for these activities: http://www.preschoolexpress.com/number_station.shtml .

Stage III: The corresponders

Children at this stage respond to the question *how many* by completely recounting the set and make an effort to do so with one-to-one correspondence. Children at this stage, however, do not yet recognize the significance of the final number and fail to repeat it or emphasize it. Just as before, the adult can *model* counting but now repeats the final number while moving his hands in a circular motion (to encompass the whole grouping) and ending with an arms-out gesture: "1, 2, 3, three all together" (Clements & Sarama, 2009, p. 27). See figure 2, below.

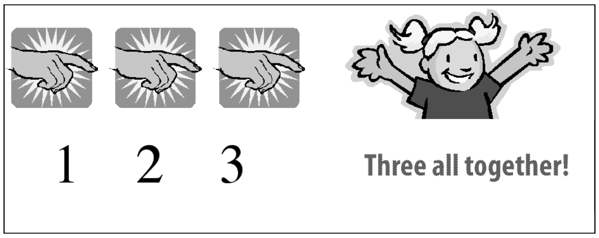

Figure 2.

Once learned, this gesture becomes a *non-verbal prompt* (Sandall, 2005) for children when they forget to repeat the final number. Note: now it's important for the adult to be using the phrase *how many*. For example, "Let's count to find out *how many* we have."

While at this stage, children may start to make the connection between the number they generate instantly when looking at a small set (perceptual subitizing) and the last number they say while counting this same set. The teacher might even share this observation: "Hey, you said you thought there were three, and when you counted you stopped at number three!"

At this stage counting is a mysterious procedure for preschoolers, and teachers should join their students in the exploration of how counting works. This is where teachers can begin to pair instruction on procedures with questions and comments that encourage children to problem solve, and to talk about their reasoning. This type of questioning and commenting is so important that the book *Mathematics: The Creative Curriculum Approach* (Copley, Jones & Dighe, 2007) includes lists of sample questions and comments not only for each component of mathematics but also for each interest area in the preschool classroom. Teachers can raise questions such as "How about if we spread these things out? Now how many are there?" Or "How about if you start counting at a different place? Do you think we'll get the same answer?" This exploration may help children grasp another important concept: the *order irrelevance rule*. This rule states that no matter where you start counting (e.g., at either end of a row), the resulting answer to *how many* is the same.

Stage IV: The immature counters

At stage four, children are focused on the final number-tag and often overlook their counting errors. Teachers can help these students by teaching them strategies for keeping track of the items already counted. These strategies could include choosing a starting point that is easy to remember, lining up the objects before counting them, or pushing items aside as they are counted into a counted pile (Clements & Sarama, 2009, p. 71).

Teachers can also help children reason and problem solve at this stage by providing them with opportunities to judge a puppet's counting accuracy. This judging includes not only observing to see if the puppet counts correctly but also identifying what the puppet does wrong. Muldoon, Lewis, and Freeman (2003) found evidence that providing four-year-olds with this type of activity encouraged them to "consider the fact that not only is the goal of counting to determine many-ness, but that judgments about manyness can be correct or incorrect depending on the accuracy of counting" (p. 695). In the author's experience preschoolers with mild disabilities are most successful at telling whether or not a puppet is right when the errors are made at the beginning (like starting to count with 0 or 2) or at the end (like stopping before all are counted, or counting the last item more than once). They are also able to tell the puppet how to do it right with suggestions such as "always start with one," "count all the things," or "start over and count slowly." A puppet with long arms and a stick attached to the palm of one hand with velcro makes a nice counting puppet (see photo).

Stage V: The rigid rule followers

At stage five, children understand that the answer to *how many* is always the largest number in the counting sequence. Teachers can observe this stage by having a puppet count a set while saying the number words in the

wrong order (e.g., "2, 4, 6, 3" for a set of four). Children who are at stage V will answer *how many* by stating the largest number used (in this case, 6) even though it is incorrect. At both stages IV and V, teachers must strive to take children from simply memorizing the procedures of counting to a more flexible conceptual understanding of quantities and how counting may or may not (if not done correctly) help to determine that manyness.

At this stage teachers can help by asking questions that prompt lots of counting. For example, when playing I Spy, they can say something like: "I spy a person with six pockets on their pants. Do you know who it is?" Teachers can also help by providing highly motivating activities, where children are so invested in getting an accurate answer that they are eager to check by counting again. If their two answers conflict, teachers should once again use questioning and commenting strategies to encourage children's reasoning and exploration of counting: "Hmmm," a teacher might say, "I wonder which answer is right? How many are there for sure? How can we figure it out? Why do you think you got a different answer that time?"

One activity that teachers may want to try is an adaptation of a game called What Color Is Missing? found in Clements and Sarama (2009, p. 31). For a small group working on the concept of four, each child is given four jewels of a unique color. One child is chosen to play the part of the pirate, and all the jewels (except the pirate's) are put into a bag. Then children close their eyes while the pirate takes one jewel out of the bag and hides it in a treasure chest. The jewels are then emptied back onto the table so that the players can recount their jewels and find out whose treasure was stolen. If more than one player thinks his or her treasure was stolen, encourage the children to recount the jewels until they figure it out.

Teachers may also want to purposely create perplexing situations for children to try to understand and explain, as did Bermejo, Morales, and de Osuna (2004). In one of the writers' scenarios, children were given a puzzle with several empty spaces and were instructed to count the spaces beginning with 2. Then, they were asked how many pieces were needed to complete the puzzle. They then received that many pieces (one too many), finished the puzzle, and were asked to explain the left-over piece. In another scenario the instructor told the child how many pieces of candy they would receive and then proceeded to count out the pieces starting with 2. The child was then asked to check to see if they'd received the correct amount. The data from this study revealed that in only a matter of days, children were able to tell the teacher which answer was wrong and, most important, *why,* thus coming to fully grasp cardinality.

Stage VI: Counters

At the sixth stage, children provide an accurate response to the question *how many*. This occurs first for the quantities 1-5 (usually around age four), and later for the quantities 6-10 (usually around age five). These children spontaneously monitor their own as well as others' counting for accuracy. If the count seems off, they might count again or use another method to check their answer such as subitizing, estimating, or comparing. They understand that only when counting is executed correctly, does the final number represent the quantity of the set.

For children able to count the smaller quantities (1-4 or 5), teachers can strengthen their understanding of these quantities by teaching them the problem-solving game How Many Are Hiding?(Copley, 2004). A video of four-year-olds participating in this game can be seen in a webcast (Copley, 2007) that can be downloaded from the Head Start archives. Through this game, children come to a thorough understanding of a quantity by learning to recognize all the combinations of smaller quantities within it (e.g., four is made up of two and two, three and one, etc.). This game is played by having one person display a set of objects in their hands, such as four pennies. Then they place their hands behind their back, distributing the pennies between their two hands. When they bring both hands forward, only one hand is opened. The object is to figure out how many are hiding in the closed hand. At times, the hider should also place all the items in one hand. This game also prepares children for understanding the operations of addition and subtraction.

For children able to count the larger quantities of 5-10, teachers can help by having students expand their ability to subitize. You may have noticed, in the pre-k curriculum focal point quoted in the second paragraph of this article, that students are to be able to recognize sets up to 10 not only by counting them *but also without counting*. The ability to spontaneously recognize larger sets (e.g., 5-12) is called *conceptual subitizing* (Clements, 1999). Teachers can help children acquire this skill by providing frequent experiences with common number displays such as finger patterns, and the dots on dice or dominoes. This ability is important because it will free up students' working memories to allow their minds to tackle the more complex problems of arithmetic they will face later on (Klein, 2000). Teachers may want to try the activity described by Clements (1999) where cards with holes punched in them are placed quickly on and then off of an overhead projector. The goal is to answer *how many* before the teacher does.

Does difficulty with counting indicate a math disability?

Gersten, Jordan, and Flojo (2005) reviewed the small body of research related to the early identification and remediation of mathematics difficulties. Unfortunately the youngest students studied have been five year-olds. They concluded that young children with math difficulties typically use counting procedures that are both inefficient and ineffective. They understand counting in a rote inflexible way and they make more counting errors. So yes, difficulty with counting may indicate that a preschooler is at risk for math difficulties later on in school. However, there is still much research that needs to be done, as well as a consensus to be developed between the fields of psychology and education about what constitutes a specific math disability.

Gersten and colleagues (2005) concluded that early intervention should include work on mature and effective counting skills (including learning to count backwards, and the order irrelevance rule), work on automatizing the combinations that make up quantities, providing opportunities to work on comparing magnitudes of numbers (which number is bigger or more), and learning to use a number line.

In another piece of recent research, it was found that teachers can help preschoolers learn to use a simple 1-10 number line with a game called The Great Race.Ramani and Siegler (2008) found this board game was especially useful in helping children form a linear spatial concept of quantities (i.e., a number line in their minds). They found that "playing such a game for roughly 1 hr [over four sessions] increased low-income preschoolers' proficiency on four tasks: numerical magnitude comparison, number line estimation [guessing where a number might be located on a number line with only 0 and 10 showing on opposite ends], counting, and numeral identification. The gains remained nine weeks later. Classmates who played an identical game, except for the squares varying in color rather than number, did not improve on any measure" (p. 375).

The Great Race game they devised consisted of a game board showing *start* and *end* boxes with 10 boxes in between with the numerals 1-10 written inside them. There was a spinner on a card that was divided in half with the number one on one side and a two on the other. There were also two game pieces that the players moved along the path. After each player had spun, he would announce the number he had spun and then move his marker the corresponding number of spaces. While moving the child would not count the spaces he moved, but instead would name the numerals on the board as he moved. "Thus, children in the number board group who were on a 3 and spun a 2 would say, '4, 5' as they moved"(p. 379). Although children with special needs may not be ready for this game until they are 5 or 6 years old, it's a tool that early childhood special education teachers could easily make and have available for when children are ready.

In Summary

The activities described here offer early childhood special education teachers a new way to teach students about counting that combines procedural instruction with opportunities to explore, problem solve and reason. This approach has the potential for providing a much more powerful instructional package than simply providing rote practice on the procedures of counting. Teachers should remember, of course, to always embed instruction in meaningful contexts with materials of interest to their young students (Notari-Syverson, A. & Sadler, F., 2008). Research specific to how preschool children with disabilities come to understand cardinality still needs to be conducted. However, the new information on the developmental progression of counting, and the activities described here from recent publications provide teachers with new tools for helping young students who struggle with this important task.

References

Baroody, A. J. (1999). The development of basic counting, number, and arithmetic knowledge among children classified as mentally handicapped. In L. M. Glidden (Ed.), *International review of research in mental retardation* (Vol. 22, pp. 51-103). New York: Academic Press.

Baroody, A.J. & Benson, A. (2001). Early number instruction. *Teaching Children Mathematics*, 8(3), 154-158.

Baroody, Arthur (2004). The Developmental Bases For Early Childhood Number and Operations Standards in D.H. Clements & J. Sarama (Eds.) *Engaging young children in mathematics* (pp.173-219) Mahwah, N.J.: Lawrence Erlbaum Associates.

Bennett-Gates, D. & Zigler, E. (1998). Resolving the developmental difference debate: An evaluation of the triarchic and systems theory models. In J.A. Burack, R.M. Hodapp, R.M. & E. Zigler (Eds.) *Handbook of mental retardation and development*, Cambridge University Press.

Benson, A. & Baroody, A.J. (2002, April). *The case of Blake: Number-word and number development*. Paper presented at the Annual Meeting of the American Educational Research Association, New Orleans, LA.

Bermejo, V. (1996). Cardinality development and counting. *Developmental Psychology*, 32, 263–268.

Bermejo, V.; Morales, S. & de Osuna, J.G. (2004). Supporting children's development of cardinality understanding. *Learning and Instruction* (14), 381-398.

Cepeda, N.J., Pashler, E.V. Wixte, J.T. & Roher, D. (2006) Distributed practice in verbal recall tasks: A review and quantitative synthesis. *Psychological Bulletin*, Vol. 132. No. 3, 354-380.

Clements, Douglas H. (1999). Subitizing: what is it? Why teach it? (Term that means to suddenly visualize how many). *Teaching Children Mathematics*, 5(7) 400-406.

Clements, D. & Sarama, J. (2009). *Learning and teaching early math: The learning trajectories approach*. New York, NY: Routledge of the Taylor & Francis Group.

Copley, Juanita V. (2007). *Webcast #2: Number and Operations*, Retrieved 06/14/2009 from the office of Head Start webcast archive, early childhood math 2007 and 2008: http://www.fc-tv.com/clients/headstartarchive/

Copley, Juanita V. (2004). *Showcasing mathematics for the young child: Activities for three-, four- and five-year-olds*. Reston, VA: National Council of Teachers of Mathematics.

Copley, Juanita V.; Jones, Candy & Dighe, Judith, (2007). *Mathematics: The Creative Curriculum Approach*, Washington, D.C.: Teaching Strategies.

Gersten, Russell, Jordan, Nancy C., & Flojo, Jonathan R. (2005). Early identification and intervention for students with mathematics difficulties. *Journal of Learning Disabilities*, 38(4), 293-304.

Klein, Juliette S. (2000). Preschoolers doing arithmetic: The concepts are willing but the working memory is weak. *Canadian Journal of Experimental Psychology*, 54(2), 105-116.

Moomaw, Sally & Hieronymus, Brenda, (1999). *Much more than counting: more math activities for preschool and kindergarten*, St. Paul, MN: Redleaf Press.

Muldoon, K.; Lewis, C. & Freeman, N.H. (2003) Putting counting to work: Preschoolers' understanding of cardinal extension. *International Journal of Educational Research*, 39, 695-718.

National Association for the Education of Young Children and National Council of Teachers of Mathematics (2002). *Early childhood mathematics: Promoting good beginnings. A joint position statement of the National Association for the Education of Young Children (NAEYC) and National Council of Teachers of Mathematics (NCTM)*. Retrieved 06/14/2009 from the web at: http://www.naeyc.org/about/positions/mathematics.asp

National Council of Teachers of Mathematics Inc. (2006). *Curriculum focal points for Pre-kindergarten through grade 8 mathematics*. Reston, VA. Retrieved 06/14/2009 from the web at: http://www.nctm.org/standards/focalpoints.aspx?id=300

National Research Council. (2001). *Adding it up: Helping children learn mathematics*. J. Kilpatrick, J. Swafford, and B. Findell (Eds.). Mathematics Learning Study Committee, Center for Education, Division of Behavioral and Social Sciences and Education. Washington, DC: National Academy Press.

Notari-Syverson, A. & Sadler, F. (2008). Math is for everyone: Strategies for supporting early mathematical competencies in young children. *Young Exceptional Children, 11(3), 2-16*.

Ramani, Geetha B. & Siegler, Robert S.(2008). Promoting broad and stable improvements in low-income children's numerical knowledge through playing number board games. *Child Development*, 79(2), 375-394.

Sandall, S., Hemmeter, M.L., Smith, B. & McLean, M.E. (2005) *DEC Recommended Practices*. Longmont, CO: Division of Early Childhood (DEC) of the Council for Exceptional Children (CEC): & Sopris West.

About the Author:

Faith H. Sadler, M.Ed. is an itinerant early childhood special education teacher working with students in community settings for Seattle Public Schools. She also presents workshops on early childhood mathematics for special education teachers.